

ASTM A193 Grade B8S (Nitronic 60) — Material Data Sheet

ASTM A193 / ASME SA-193 · UNS S21800 · Alloy 218 (Nitronic® 60)

Silicon-manganese austenitic stainless steel with built-in galling resistance, carbide solution treated

Nitronic 60 bolting — the anti-galling stainless: 95 ksi, non-magnetic, and threads that will not seize against other stainless steels.

TENSILE, CLASS 1C / 1D	95 ksi min	HEAT TREATMENT	Carbide solution treated
YIELD	50 ksi min	COMPANION NUT	ASTM A194 8S
HARDNESS	271 HBW / 28 HRC max	GALLING RESISTANCE	Excellent, no lubricant needed

Nominal composition



Midpoints of the specification ranges, for orientation only. Limits are in the table.

Chemical composition — ASTM A193 B8S (Alloy 218 / Nitronic 60, UNS S21800)

Element	Symbol	Min %	Max %
Carbon	C	—	0.10
Manganese	Mn	7.0	9.0
Phosphorus	P	—	0.060
Sulfur	S	—	0.030
Silicon	Si	3.5	4.5
Chromium	Cr	16.0	18.0
Nickel	Ni	8.0	9.0
Nitrogen	N	0.08	0.18

Values per ASTM A193/A193M-24, Tables 1 and 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.276 lb/in ³ (7.63 g/cm ³)
MODULUS OF ELASTICITY	26.2 × 10 ⁶ psi (181 GPa)
MAGNETIC	No — remains non-magnetic after cold work

Heat treatment

Class 1C: carbide solution treated bar, wire and finished components (clause 6.2.2). Class 1C B8SA: solution treated in the finished condition (clause 6.2.4). Class 1D: bar or wire cooled rapidly from above 1750 °F immediately after hot working, without a separate solution treatment; Class 1D is restricted to service below 850 °F and applies only to bar and to components machined from it without further hot or cold work (clause 6.2.3).

Mechanical properties — ASTM A193 B8S

Nominal diameter (in.)	Tensile strength, min (ksi)	Yield strength 0.2% offset, min (ksi)	Elongation in 4D, min (%)	Reduction of area, min (%)	Hardness, max
Class 1C and 1D — all diameters	95	50	35	55	271 HBW / 28 HRC

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Applicable standards

ASTM A193 / ASME SA-193	Alloy-steel and stainless steel bolting for high-temperature or high-pressure service
ASTM A194 GRADE 8S	Companion Nitronic 60 nuts
ASTM A276 / A479	S21800 bar stock
ASTM F593 / F594	Stainless fasteners (alloy group 6)

Forms we supply in A193 B8S

- Full-thread studs and stud bolts
- Double-end and tap-end studs
- Hex and heavy hex bolts
- Socket head cap screws
- Threaded rod (cut and rolled thread)
- Machined components from certified bar

Typical applications

- Valve stems, seats and bonnet bolting
- Food, beverage and pharmaceutical equipment where lubricants are prohibited
- Nuclear plant fasteners
- Marine hardware and pump wear parts
- Any stainless joint that is repeatedly assembled